identify hepatitis B virus in serum specimens and herpesvirus in paraffin blocks of specimens of infected skin, with 100% sensitivity and specificity. With this modified technique, the entire procedure can be done in less than six hours, with no need for radioisotopes. Therefore, the polymerase chain reaction offers a rapid, sensitive, and specific technique for detecting infectious agents that can use both fresh and fixed material and in the future may be increasingly used in clinical laboratories for diagnostic purposes.

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REFERENCES

Cao M, Xiao X, Egbert B, et al: Rapid detection of herpes simplex virus infection with the polymerase chain reaction. J Invest Dermatol, in press

Kwok S, Mack DH, Mullis KB, et al: Identification of human immunodeficiency virus sequences by using in vitro enzyme amplification and oligomer cleavage detection. J Virol 1987; 61:1690-1694

Shibata DK, Arnheim N, Martin WJ: Detection of human papillomavirus in paraffin-embedded tissue using the polymerase chain reaction. J Exp Med 1988; 167:225-230

Diagnosis of Small Round Cell Tumors in Children

THE TERM "SMALL, ROUND, BLUE CELL TUMORS" refers collectively to a group of several aggressive malignant disorders of childhood of diverse histogenesis that are capable of presenting histologically as proliferations of small primitive cells with round nuclei and undifferentiated cytoplasm. The most important of these are lymphoma, Ewing's sarcoma, rhabdomyosarcoma, and neuroblastoma, although a number of other disorders are occasionally considered in the differential. While most cases of each of these neoplasms can be diagnosed by conventional histopathology, some of these tumors elude identification by routine light microscopy alone. Fortunately, several ancillary techniques, including sophisticated applications of recent advances in immunology, genetics, and molecular biology, are available for resolving problematic cases.

Electron microscopy will often provide an answer in these cases by revealing neuritic processes in neuroblastoma, actin-myosin bundles in rhabdomyosarcoma, glycogen pools and a general lack of cytoplasmic differentiation in Ewing's sarcoma, an absence of true cell attachments in lymphoma, and various other features. Immunocytochemistry has proved its value in the diagnosis of small, round, blue cell tumors. The detection of myoglobin or desmin or both in primitive tumor cells may confirm the diagnosis of rhabdomyosarcoma, while a positive reaction for neuron-specific enolase may point towards neuroblastoma or other primitive neural tumors. Newer monoclonal antibodies against muscle-specific actin and various neural antigens such as Leu-7 and HSAN 1.2 are providing additional help. The demonstration of leukocyte-common antigen may be invaluable in the diagnosis of lymphoma in an unusual site, while a battery of more specific markers may aid in its precise classification.

The most exciting recent advances in the diagnosis of small, round, blue cell tumors have been in the study of tumor cell chromosomes and DNA by cytogenetic and molecular genetic methods. Specific chromosomal abnormalities have been found in certain tumors, such as a reciprocal 11:22 translocation in Ewing's sarcoma. The finding of the same translocation in peripheral neuroepithelioma raises fascinating histogenetic possibilities. Studies of oncogene amplification and expression in small, round, blue cell tumors, such as the N-*myc* oncogene in neuroblastoma, have been shown to provide useful diagnostic and prognostic information and to shed light on tumorigenesis. These and other newer developments bring us closer to our goal of a precise diagnosis in every case of small, round, blue cell tumor.

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REFERENCES

Brodeur GM, Seeger RC, Schwab M, et al: Amplification of N-*myc* in untreated human neuroblastomas correlates with advanced disease stage. Science 1984; 224:1121-1124

Mierau GW, Berry PJ, Orsini EN: Small round cell neoplasms: Can electron microscopy and immunohistochemical studies accurately classify them? Ultrastruct Pathol 1985; 9:99-111

Triche TJ, Askin FB, Kissane JM: Neuroblastoma, Ewing's sarcoma, and the differential diagnosis of small-, round-, blue-cell tumors, *In* Finegold M (Ed): Pathology of Neoplasia in Children and Adolescents. Philadelphia, WB Saunders, 1986, pp 145-195